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Patentanmeldung Nr. Patent application No. Demande de brevet n°

02078263.7

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Bezeichnung der Erfindung/Title of the invention/Titre de l'invention:
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If no title is shown please refer to the description.
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Device for placing a lamp in a reflector

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Device for placing a lamp in a reflector

The invention relates to a device for placing a lamp in a reflector, said device comprising: a socket for holding a lamp and a back plate to be secured to the reflector.

DE- A1-197 52 979 describes inserting of a lamp in a reflector at the rear side of an automobile. Although this device is used in automobiles, it has e.g. the disadvantage that the socket holding the lamp is not pressed with a sufficient high force against the reflector to withstand strong vibrations and shocks to place the lamp always safely in the right position.

The invention solves this problem and further provides a device of a principle other construction , to make use of a back plate for holding a socket safely pressed against a reflector, preferably a reflector of an automobile.

According to the invention there is provided a device for placing a lamp in a reflector, said device comprising:

- a socket for holding a lamp and
- a back plate to be secured to the reflector,

characterized in that

said socket being provided with a main body part, with a reference plane to be to be brought in contact with the a reflector surface, with means for holding the lamp at one side of the reference plane, with a resilient annular spring secured to the main body part at the opposite side of the reference plane and with two upstanding arms provided with clicks ,

said back plate being provided with pressure points ,

wherein when securing the back plate to the reflector the reference plane is brought in contact with the said reflector surface and the pressure points, when in contact with the clicks of the socket, displace the clicks in the direction of the reflector over a distance Δx to bring the annular spring under tension, said distance Δx being such that the annular spring presses the reference plane to the said reflector surface with a force of at least 5N, preferably with a force of at least 10 N.

According to a preferred embodiment the clicks are displaced by the pressure points over a distance ranging from 0,5 mm up to 2 mm, preferably 0.8 mm to 1,3 mm. This ensures a desired safe positioning of the lamp in the reflector.

Advantageously the main body part is provided with two electric conducting female terminals and the back plate is provided with two mating electric conducting male terminals such that, when the back plate is moved to the socket, the male terminal is inserted with friction in the female terminal, to hold the back plate and socket together and to adjust the pressure points with respect to the clicks.

According to a further preferred embodiment the socket is formed as an integral part of a synthetic resin, preferably polyamide. This socket has good resiliency and can withstand the relatively high temperatures generated by the lamp.

Preferably the back plate is made of electric insulating material and is provided with printed circuit(s) connected to the male terminals.

According to a further preferred embodiment the back plate shows more than one set of pressure points to bring an equal number of sockets in contact with a reflector unit provided with a number of reflectors. For instance a back light, a brake light and a direction indicator light can in this way easily and safe being placed in the reflector unit.

The invention further relates to a socket for use in the said device and to a back plate for use in the device.

A non limiting but preferred embodiment of the invention will now be described with reference to the drawing in which:

Fig. 1 is a socket to be secured to a reflector,

Fig. 2 shows a back plate with socket according to the invention,

Fig. 3 is a very schematic view of the combination back plate and socket and

Fig. 4a - 4d show several steps of securing the socket to a reflector.

Fig. 1 is a schematic perspective view of a lamp mounting socket or cap 1 for a light source, especially a halogen lamp, e.g. to be used as a tail lamp in an automobile. The socket or cap 1 has a main body part 2. This main body part 2 is provided with upstanding resilient tongues 3 with small conical protuberances or catches 4 to securely hold a light source. At the underside of the main body part 2 an annular spring 5 is secured at two diametrically opposite places indicated with the reference numeral 6 (only one is shown). The annular spring 5 is at two diametrical opposite sides provided with upstanding arms 7. These

upstanding arms 7 are disposed substantially 90° offset with respect to the securing places 6 of the annular spring 5. The arms 7 are at their ends provided with catching noses or clicks 8.

The socket or cap 1 is formed as one single part of a thermoplastic resin, preferably polyamide. This material has a sufficient resiliency and can withstand the relatively high temperatures that are generated by the lamp in use.

A socket or cap 1 of this kind is intended to be used in a reflector of an automobile, e.g. as a socket for a tail light, a braking light or a direction indicator light. After a lamp (not shown in this figure), e.g. a recently developed high performance halogen lamp of small dimension but with a high light intensity, is inserted in the socket or cap 1 and the catches 4 securely hold the lamp, the cap is to be mounted on a reflector. For this purpose the reflector is provided with a mounting opening in which the circular main body part 2 of the cap 1 can be inserted. The reflector may normally further be provided with depending wall parts, e.g. with an opening. Each socket click 8 can be clicked into such an opening by pressing the resilient annular spring 5 upwards. The resiliency of the spring activates a pressure force to withstand vibrations and shocks and to safely hold the cap 1 in the reflector. Such a kind of securing belongs to the knowledge of a skilled in the art.

To seal the cap in the reflector against humidity or dust the main body part 2 can at its circumference be provided with an annular groove (not shown) in which a sealing ring can be inserted.

Sockets of this kind normally have in the hollow inner part of the main body 2 electrical contacts to be connected to a plug or connector, to provide the electrical energy for the lamp. At the rear of an automobile the reflector might have a lamp for the backing light, a lamp for the brake light and a lamp for the direction indicator, so that for each lamp a socket or cap 1 has to be clicked in the relevant part of the reflector and the plug or connector has to be inserted in the socket. The electrical wires of the connector are normally led to a printed circuit board provided with the required electrical circuit(s).

An important number of set makers prefer the mounting of the sockets or caps 1 in a reflector with the use of a "back plate" instead of clicking caps with the clicks 8 in relevant in click openings of the reflector. This may further lead to advantageously prevent the use of the mentioned plug or connector and does not need the securing the electrical leads of the plug(s) to e.g. a separately positioned circuit board.

Fig 2 illustrates schematically an example of the possibility of mounting the cap 1 with help of a schematically shown back plate 11. The solution according to the

invention is such that the construction of the cap can essentially be equivalent to the cap according to fig. 1, only the electrical connections need a minor change.

In Fig. 2 the cap 1 is shown with the main body part 2, the tongues 3 provided with the small conical catches 4 to hold a lamp tightly, the resilient annular spring 5 and the upstanding arms 7 with catching noses or clicks 8. In the shown embodiment the electrical connection to an electrical power supply is formed by electrically conducting hollow terminals 10 of rectangular cross section (only one is shown). These terminals or female contacts 10 are secured to the elements to connect the annular spring 5 to the main body part 2, e.g. as indicated by the reference numeral 6 in Fig. 1. The electrical connection of the hollow terminals to the lamp to be placed in the cap 1 can be of any suitable kind within the knowledge of a skilled in the art and is not relevant for the present invention.

Fig. 2 schematically shows a back plate 11 (or mounting panel with printed circuit). The back plate 11 consists of an electrically non conducting material and is provided with printed circuit of which only schematic leads 12 are shown in this Figure. The back plate 11 is provided with electrical conducting upstanding back plate terminals or male contacts 13. These male contacts 13 of the back plate 11 can be inserted in the female contacts 10 of the cap 1 when the back plate 11 is brought in contact with the cap 1. Friction contact between the terminals 13 and the hollow terminals 10 ensures that the back plate 11 and cap 1 are held together before this combination is secured to the reflector of e.g. a rear light of an automobile and also takes care of the necessary electrical contact.

According to the invention the back plate 11 is provided with pressure points 14 that, when the back plate 11 and the cap 1 are moved together, are brought in contact with the clicks 8 of the upstanding arms 7 of the cap 1.

Fig. 3 is a very schematic view in which only the for the invention essential parts of Fig. 1 and 2 are shown, to disclose the principle of the invention. A cap 1 as shown in Fig. 1 and 2 will not be clicked with the clicks 8 in openings of depending parts of a reflector, as mentioned with reference to Fig. 1, but according to the invention use is made of a back plate 11 with pressure points that can come into contact with the clicks 8 of the arms 7. When securing the back plate 11 to the reflector, as will be described with reference to Fig. 4, the pressure points 14 displace the clicks over a small distance and thus exercise a force in the annular spring 5, due to which the cap 1 will brought in the right position in the reflector and can further withstand vibrations and shocks so that it will be securely be held in place. (Only a part 15 of the reflector is shown, said part being provided with an opening 18 (see

Fig. 4c) in which the upper portion of the main body part 2 is inserted; a lower portion of the main body part 2 is in contact with the reflector 15 at the position of a reference plane 16).

Fig. 4 a - d show the principle how the combination of cap 1 and back plate 11 is used to safely secure the cap 1 in the reflector 17.

In Fig. 4a the cap 1 and back plate are shown in the still separated position in which the cap1 is placed above the back plate 11. Back plate 11 and cap 1 are brought in the mutual correct position with help of the male terminals 13 being inserted in the female terminals10.

Fig. 4b sows the position in which the cap and back plate are held together due to the friction between the male terminal 13 that is inserted in the female terminal .The pressure points 14 are in contact with the clicks 8 but do not exercise a force on the clicks. The annular spring 5 is thus free of tension.

In Fig. 4c the reflector 17 is schematically shown. The reflector has an opening 18 in which the upper part of the cap can be inserted (as described with reference to Fig. 3).

Fig. 4 d shows how the combination cap and back plate is mounted on the reflector 17 (see also Fig. 3). First the reference plane 16 comes in contact with the reflector. Then the back plate will be secured to the reflector. This can e.g. take place by securing the back plate to the reflector with the aid of screws (not shown) or in any other suitable way. The reference plane 16 is brought in contact with the reflector surface and the pressure points 14, when in contact with the clicks 8, displace the clicks in the direction of the reflector over a distance Δx to bring the annular spring 5 under tension. The distance of displacement of the clicks 8 with respect to the main body part 2 of the socket has such a value that the annular spring presses the reference plane 16 against said reflector surface. This pressing force is at least 5 N and preferably at least 10N. In this way the socket is safely held to the reflector, can withstand vibrations and shocks while the lamp is placed in the desired position. Preferably the distance Δx ranges from 0,5 mm up to 2 mm, more preferably from 0,8 mm to 1.3 mm.

The back plate can shows more than one set of pressure points (14) to bring an equal number of sockets in contact with a reflector unit provided with a number of reflectors. This may be chosen when e.g. in the rear part of an automobile a back light, a braking light and/or a direction indicator light has to be placed in the reflector unit.

It will be understood that the description and drawing form only a non limiting example of the present invention and that changes and modifications may be included in the scope of the appended claims.

CLAIMS:

1. Device for placing a lamp in a reflector, said device comprising:

- a socket for holding a lamp and
- a back plate to be secured to the reflector,

characterized in that

said socket (1) being provided with a main body part (2), with a reference plane to be (16) to be brought in contact with the a reflector surface, with means (3) for holding the lamp at one side of the reference plane, with a resilient annular spring (5) secured to the main body part at the opposite side of the reference plane and with two upstanding arms (7) provided with clicks (8),

said back plate (11) being provided with pressure points (14),

wherein when securing the back plate to the reflector the reference plane (16) is brought in contact with the said reflector surface and the pressure points (14), when in contact with the clicks (8) of the socket, displace the clicks (8) in the direction of the reflector over a distance Δx to bring the annular spring (5) under tension, said distance Δx being such that the annular spring (5) presses the reference plane to the said reflector surface with a force of at least 5N, preferably with a force of at least 10 N.

2. Device according to claim 1, characterized in that the clicks (8) are displaced by the pressure points (14) over a distance ranging from 0,5 mm up to 2 mm, preferably 0.8 mm to 1,3 mm.

3. Device according to claim 1 or 2, characterized in that the main body part (2) is provided with two electric conducting female terminals (10) and the back plate (11) is provided with two mating electric conducting male terminals (13) such that, when the back plate is moved to the socket, the male terminal (13) is inserted with friction in the female terminal (10), to hold the back plate and socket together and to adjust the pressure points (14) with respect to the clicks (8).

4. Device according to anyone one of the preceding claims, characterized in that the socket (1) is formed as an integral part of a synthetic resin, preferably polyamide.

5. Device according to any one of the preceding claims, characterized in that the back plate (11) is made of electric insulating material and is provided with printed circuit(s) connected to the male terminals (13).

6. Device according to any one of the preceding claims, characterized in that the back plate shows more than one set of pressure points (14) to bring an equal number of sockets in contact with a reflector unit provided with a number of reflectors.

7. Socket for use in a device as claimed in any one of the claims 1 to 6.

8. Back plate for use in a device as claimed in any one of the claims 1 to 6.

ABSTRACT:

In a device for placing a lamp in a reflector, a socket (1) for holding a lamp is provided with a main body part (2), with a reference plane to be (16) to be brought in contact with the a reflector surface, with means (3) for holding the lamp at one side of the reference plane, with a resilient annular spring (5) secured to the main body part at the opposite side of the reference plane and with two upstanding arms (7) provided with clicks (8), whereas a back plate (11) is provided with pressure points (14). When securing the back plate to the reflector the reference plane (16) is brought in contact with the said reflector surface and the pressure points (14), when in contact with the clicks (8) of the socket, displace the clicks (8) in the direction of the reflector over a distance Δx to bring the annular spring (5) under tension, said distance Δx being such that the annular spring (5) presses the reference plane to the said reflector surface with a force of at least 5N, preferably with a force of at least 10 N.

(Fig. 3)

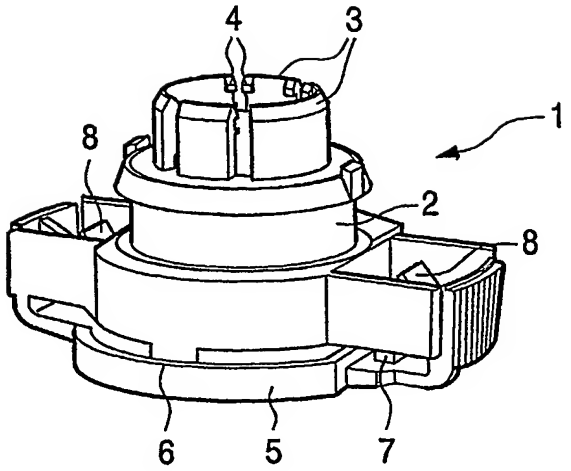

Fig.1

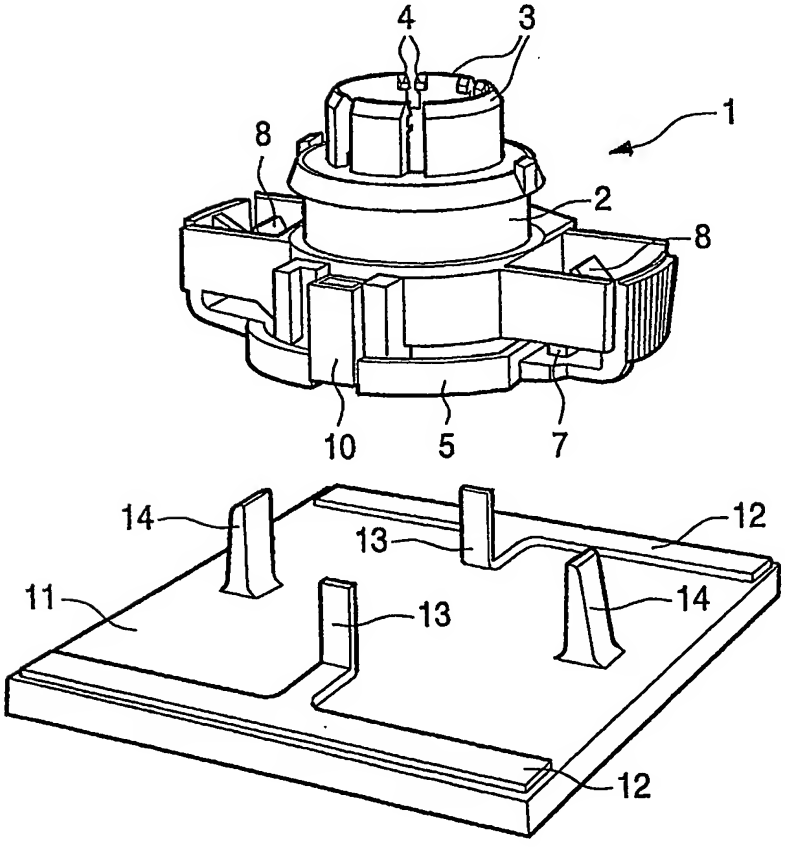

Fig.2

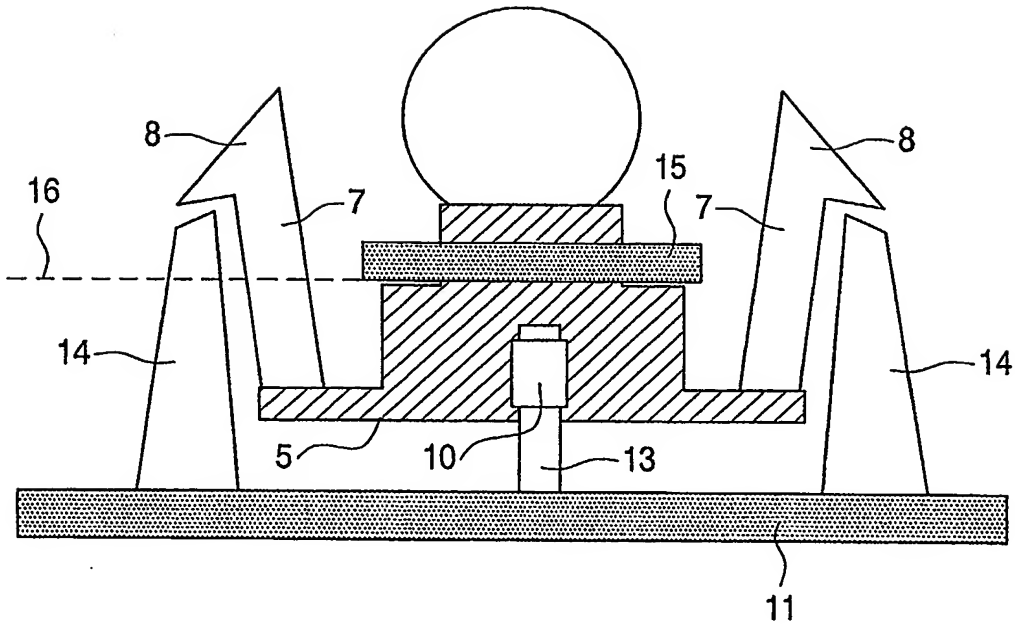

Fig.3

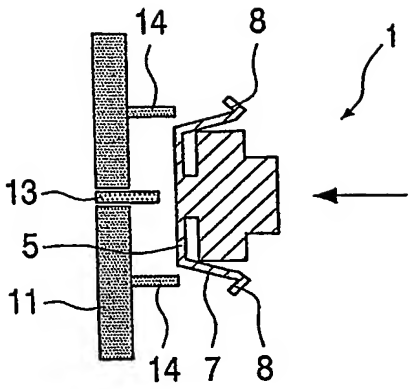

Fig.4A

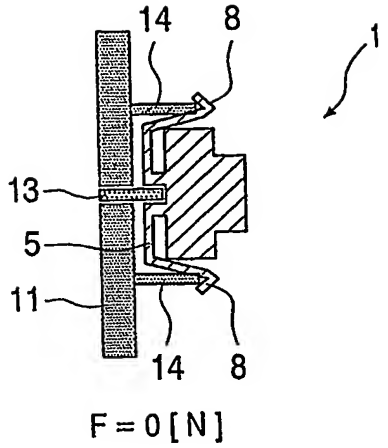

Fig.4B

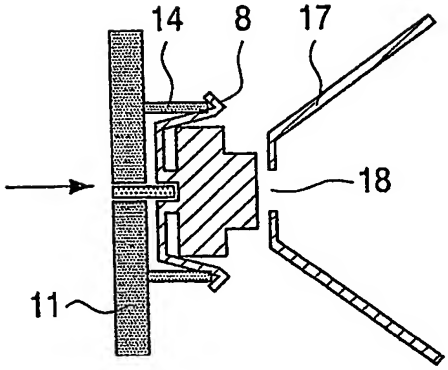

Fig.4C

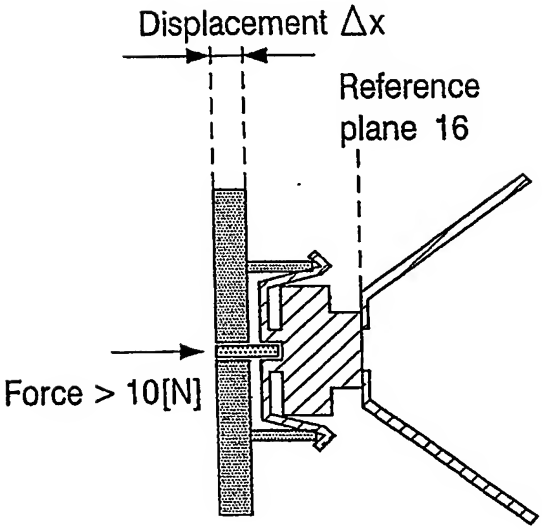

Fig.4D